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KITOI BAY HATCHERY
ANNUAL MANAGEMENT PLAN, 1995

By

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INTRODUCTION

Kitoi Bay Hatchery is located on Afognak Island (58°11'04" N. latitude, 152°21'04" W. longitude) on the west side of Izhut Bay (Figure 1).

The primary user group served by the hatchery is the Kodiak commercial purse seine salmon fishers. Approximately 385 purse seine and 30 beach seine permits are registered in Kodiak. Set gillnet fishers also benefit as a result of the relocation of ~30-40% of the purse seine fleet to target Kitoi fish. Sport and subsistence fishermen comprise the secondary user groups, harvesting fish produced from stocking in other locations in the Kodiak area.

The main goals of the Kitoi Bay Hatchery are to increase the number of returning adult pink, chum, sockeye, and coho salmon available to the Kodiak area fisheries, and to increase the commercial harvest in areas that historically did not produce good or sustained catches, i.e. cape fisheries in the Duck Bay/Izhut Bay areas. The hatchery provides coho salmon fingerlings for programs designed to create recreational salmon fisheries near Kodiak's remote villages. A subsistence fishery has been created in the Port Lions and Ouzinkie villages from stocking coho in barren lakes.

A pilot project using 0-check sockeye was initiated in 1989 and continued in 1994. The original goal was to rear fry to the target size of 2-3 gram smolt for release each summer. This project was expected to produce several hundred thousand sockeye for harvest. Due to returns at less than projected levels, however, this project was modified in 1993 to produce primarily 4-5 gram presmolt and 8.0 gram yearling smolt. A coho smolt production program was also started in 1992 which will continue to contribute several thousand adults to the harvest each year.

RELEASE SITES FOR 1995

A. 1995 Big Kitoi Bay Release (Table 1):

1. Species: Pink Salmon
2. Eggs taken: 174.0 million (117,810 females, 39,270 males, 157,080 total adults); Big Kitoi brood stock (BR 94)
3. Number To Be Released (May, June): 138.0 million 0.5 g fry; 15.0 million 0.2 g fry (88%)
4. Expected Return: (July and August, 1996) 2.3 million (1.5%)
5. FTP # 81-241 (expires 6/95)

Pink salmon will be released in Kitoi Bay adjacent to the hatchery. A total of 140 million pink fry will be short-term reared in net pens with the remainder as volitional releases.

B. 1995 Big Kitoi Bay Release:

1. Species: Chum Salmon
2. Eggs taken: 14.4 million (7,200 females, 6,700 males, 13,900 total adults); Big Kitoi brood stock (BR 94)
3. Number To Be Released (May): 10.0 million 2.0 g fry (75%)
4. Expected Return: (June and July, 1998, 1999, 2000) 220,000 (2%)
5. FTP #: 81-156

Chum salmon fry will be reared until they reach a size of 2.0 grams. Chum salmon will be released in Kitoi Bay adjacent to the hatchery.

C. 1995 Crescent, Jennifer, Little Kitoi, Ruth and Katmai Lakes Releases (see Table 1 for each lake):

1. Species: Coho Salmon
2. Eggs taken: 570,000 (198 females, 97 males, 295 total adults); L.Kitoi brood stock (BR 94)
3. Number To Be Released (June; Katmai Creek, Sept): 505,000 1.5-5.0 g fingerlings (89%)
4. Expected Return: (August and September, 1997, 1998) 10,000 (2-7%)
5. FTP #: 92A-0079, 92A-0081, 92A-0080, 92A-0089

Coho pre-smolts (1994 BR) will be flown into Katmai Creek Lake adjacent to the village of Ouzinkie in late fall. Coho fingerlings (1994 BR) will be released into Crescent, Jennifer, Ruth, and Little Kitoi Lakes in the spring of 1995.

D. 1995 Big Kitoi Bay Release:

1. Species: Coho Salmon
2. Eggs taken: 375,000 (100 females, 50 males, 150 total adults); L.Kitoi brood stock (BR 94)
3. Number To Be Released (June): 260,000 (70%) 20 g smolt
4. Expected Return: (August and September, 1996, 1997) 26,000 (10%)
5. FTP #: 94A-0063 (amend to 300,000 release)

Coho salmon smolt (1994 BR) will be reared to 20.0 grams and held in net pens adjacent to the hatchery for one or two weeks prior to release.

E. 1995 Little Kitoi Bay Release:

1. Species: Sockeye Salmon
2. Eggs taken: 1.0 million (500 females, 160 males, 660 total adults); L.Kitoi brood stock (BR 93)
3. Number To Be Released (May): 975,000 (98%) 8.0 g smolt
4. Expected Return: (July and August, 1997, 1998) 146,000 (15%)
5. FTP #: 93A-0117 (expires 7/95; amend to 1 million release)

Upper Station sockeye salmon smolt (1993 BR) will be reared in UV treated water until May (8.0 g) and then salt water challenged; when feasible, blood samples will be collected to measure sodium levels. When sodium levels are $\leq$ 170 microequivalents per liter (ueq/l), smolt will be released into net pens for a brief period (24-36 hours) in the estuary (near the outlet) at Little Kitoi. After this imprinting period they will be released into Little Kitoi Bay.

F. 1995 Little Kitoi Lake Release:

1. Species: Sockeye Salmon
2. Eggs taken: 372,000 (120 females, 60 males, 180 total adults); U.Station brood stock BR 94)
3. Number To Be Released (June, July): 298,000 (80%) zero-age 3.0 g smolt
4. Expected Return: (July and August, 1997, 1998) 3,000 (1%)
5. FTP # 88A-1047 (expires 7/31/95)

Upper Station age 0. sockeye salmon fry (1994 BR) will be reared to a size of 2-3 grams prior to release into Little Kitoi Lake in July or early August.

If Pillar Creek Hatchery produces less than the expected number of sockeye fry for stocking into Spiridon and/or Jennifer Lake, the stocking planned for Little Kitoi Lake will be either reduced or eliminated to provide replacement fry (FTP's 94A-0011, 94A-0040).

Stocking of age 0. sockeye smolt into L.Kitoi Lake will be planned to provide for volitional migration from the lake. A portion of the smolt will be stocked near the outlet (50,000); a smolt counter will be monitored to determine if migration from the lake occurs. If migration does occur, then the remainder of smolt will be stocked into the lake. If the initial stocking of smolt hold over in the lake, the remainder will be stocked into lower Jennifer Lake (FTP 94A-0040).

G. 1995 Little Kitoi Lake release:

1. Species: Sockeye Salmon
2. Egg Take Goal: 200,000 (100 females, 80 males, 180 total adults); U.Station brood stock (BR 94)
3. Number To Be Released (October): 150,000 (75%) 6.0 g pre-smolt
4. Expected Return: (July and August, 1998, 1999) 15,000 (10%)
5. FTP #: 93A-0016

Pre-smolt will be released into Little Kitoi Lake in late October or early November, just prior to freeze up, to minimize the likelihood of plankton cropping.

EGG TAKE GOALS BY SPECIES AND BROOD SOURCE LOCATION FOR 1995

Egg take goals and release numbers may be adjusted in season in response to lake studies and available space for incubation.

A. 1995 Big Kitoi Creek egg takes (Table 2):

1. Species: Pink Salmon
2. Egg Take Goal: 215 million (145,000 females, 50,000 males, 250,000 total)
3. Expected Release: (May and June, 1996) 182.0 million (89%) 0.5 and 0.2 g fry in Big Kitoi Bay
4. Expected Return: (July and August, 1997) 2.7 million (1.5%)
5. FTP #: 81-241

Pink 195,000 brood stock, 6,000 escapement plus 55,000 for mortality and strays.

1. Species: Chum Salmon
2. Egg Take Goal: 25.0 million (12,500 females, 6,500 males, 19,000 total adults)
3. Expected Release: (May, 1996) 18.7 million (75%) 2.0 g fry in Big Kitoi Bay
4. Expected Return: (June and July, 1999, 2000, 2001) 375,000 (2%)
5. FTP #: 81-156

Chum 20,000 brood stock, no escapement requirement.

1. Species: Coho Salmon
2. Egg Take Goal: 650,000 (217 females, 200 males, 417 total adults)
3. Expected Release: (June; Katmai September, 1996) 476,000 (73%) 1.5-5.0 g fingerlings in Crescent, Jennifer, Ruth, Little Kitoi, and Katmai Lakes
4. Expected Return: (August and September, 1998, 1999) 11,170 (2-7%)
5. FTP #: 92A-0083, 92A-0089, 92A-0080, 92A-0079, 92A-0081

1. Species: Coho Salmon
2. Egg Take Goal: 1.0 million (350 females, 350 male, 700 total adults)
3. Expected Release: (June, 1997) 750,000 (75%) 20 g smolt in Big Kitoi Bay
4. Expected Return: (August and September, 1998, 1999) 75,000 (10%)
5. FTP #: 94A-0036

Coho 1,120 brood stock, no escapement requirement.

B. 1995 Upper Station Lake egg take:

1. Species: Sockeye Salmon
2. Egg Take Goal: 370,000 (120 females, 60 males, 180 total adults)
3. Expected Release: (July, 1996) 264,000 (80%) zero-age 3.0 g smolt in L.Kitoi Lake
4. Expected Return: (July and August, 1998, 1999) 2,600 (1%)
5. FTP # 93A-0016

Upper Station late run 200 brood stock; 150,000 late run minimum escapement (50% of escapement over 150,000 is available for egg take). Egg take is contingent upon egg take level at Little Kitoi.

If Pillar Creek Hatchery produces fewer sockeye juveniles than planned for stocking of Spiridon and Jennifer Lakes, these fish will serve as replacement fry (FTP's 94A-0011, 94A-0040); Jennifer Lake will be an alternate stocking site if Little Kitoi Lake is unsuitable for stocking.

C. 1995 Little Kitoi Lake egg takes:

1. Species: Sockeye Salmon
2. Egg Take Goal: 1.0 million (600 females, 450 males, 1,050 total adults)
3. Expected Release: (May, 1997) 880,000 (75%) 8 g smolt in L.Kitoi Bay
4. Expected Return: (July and August, 1999, 2000) 132,000 (15%)
5. FTP #: 93A-0117 (amend to 1 million release)

Little Kitoi late run 1,250 brood stock. An escapement of 15,000 would meet the egg take requirements of Kitoi and Pillar, and allow 4,000 spawners.

1. Species: Sockeye Salmon
2. Egg Take Goal: 200,000 (80 females, 80 males, 160 total adults)
3. Expected Release: (October, 1996) 150,000 (75%) 6.0 g pre-smolt in Little Kitoi Lake
4. Expected Return: (July and August, 1998, 1999) 15,000 (10%)
5. FTP #: 93A-0016

EXTENDED HATCHERY REARING IN 1995

A. 1994 Big Kitoi Creek egg take:

1. Species: Coho Salmon
2. Eggs Taken: 1.0 million (333 females, 110 males, 443 total adults)
3. Expected Release: (June, 1996) 700,000 (75%) 20 g smolt in Big Kitoi Bay
4. Expected Return: (August and September, 1997, 1998) 70,000 (10%)
5. FTP #: 94A-0036

Approximately 750,000 juvenile coho (1994 BR) will be reared to smolt for release in 1996.

B. 1994 Little Kitoi Lake egg take:

1. Species: Sockeye Salmon
2. Eggs Taken: 950,000 (475 females, 217 males, 692 total adults)
3. Expected Release: (May, 1996) 800 thousand (80%) age 1. 8 g smolt in L. Kitoi Bay.
4. Expected Return: (July and August, 1998, 1999) 120,000 (15%)
5. FTP #: 93A-0017

HARVEST MANAGEMENT

A. Estimated Run, Brood, and Harvest Numbers for 1995:

Location	Species	Total Return	Harvest
Kitoi Bay			
	Pink	8,200,000	7,950,000
	Chum	140,000	110,000
	Coho	20,000	18,000
Little Kitoi			
	Sockeye	15,000	10,000
Crescent Lake			
	Coho	3,500	3,500
Katmai Creek			
	Coho	1,000	1,000

B. General Conditions:

1. The primary objective of the Kitoi Bay Hatchery is to provide fish to the common property fishery. It is recognized that a joint effort between ADF&G and KRAA is necessary to continue the operation of the hatchery at full production levels.

2. Operation of the hatchery will maintain the genetic diversity of pink salmon and chum salmon brood stocks at Kitoi Bay Hatchery and allow future harvest in the common property fishery (see page 8).

3. The ADF&G Area Management Biologist in Kodiak will manage the fishery to ensure adequate brood stock and an orderly common property fishery.

C. Special Harvest Area (SHA) Description and Conditions

All waters of the Kitoi Bay Section, north of a line from the regulatory markers located at the entrance of Kitoi Bay, are designated as the SHA (the Kitoi Bay Section as described in the 1995 Commercial Finfish Regulation book).

D. Harvest Strategies

1. Funds received from the cost recovery in 1989 will be used to operate the hatchery in FY96. The common property fishery will harvest all excess pink salmon over the brood stock needs. An early fishery to harvest excess male pink salmon is expected to occur after July 25 in the Kitoi Bay Section.

2. Incidental Species Catch.

   Due to the harvest location, incidental species catch will be insignificant.

3. Contingency.

   Priority will be given to the brood stock capture of the pink salmon run to Kitoi Bay Hatchery. In the event that surplus fish are available, the SHA will be opened by emergency order. Brood stock collection will take precedent over other operations if a smaller than predicted run of pink salmon occurs.

4. Catch Monitoring.

   Fish harvested in those areas known to contain hatchery fish will be monitored by ADF&G fish tickets.

E. Return Site: Kitoi Bay

Overview

Kitoi Bay Hatchery's long term goal has been to increase fishing opportunities in those management units adjacent to the hatchery which are regulated for hatchery production. Hatchery operations are being modified to maximize the facilities capacity to provide increased and diverse returns over an extended time period. Annual returns of four species involving five stocks (listed below) occurring from early June through early September will yield increased fishing time in the Kitoi Bay, Izhut Bay and Duck Bay management units (Figure 2). The Board of Fisheries approved Eastside Afognak Management Plan identifies a common property harvest strategy for Kitoi Bay Hatchery returns (Table 3).

Inseason management of Kitoi Hatchery returns is complicated because of over lapping run timing between stocks and the escapement priority given to brood stock requirements. Brief inseason compromises in fishing opportunities in any or all management units, may be necessary to achieve brood stock goals. These compromises may occur more frequently in the Kitoi Bay Section and least frequently in the Duck Bay Section, and should occur in a manner which maintains normal run timing of hatchery returns. During the brood stock collection period (identified below), the burden of achieving adequate brood stock escapements while maintaining high quality harvests on hatchery-bound returns will be shared by the Commercial Fisheries Management Biologist and the Kitoi Bay Hatchery manager.

Implementation of the Eastside Afognak Management Plan can be aided by clarifying brood stock collection activities, which are planned to be completed as follows:

Early-run sockeye returning to Little Kitoi Lake - 09 June through 15 June.

Early-run chum returning to Big Kitoi Lake - 15 June through 20 July.

Late-run sockeye returning to Little Kitoi Lake - 20 July through 15 August.

Mid-run pinks returning to Big Kitoi Lake - 8 August through 20 August.

Mid-run coho returning to Big Kitoi Lake - 20 August through 5 September.

Pink Salmon

Pink salmon produced at Kitoi Bay hatchery are taken in purse and beach seine fisheries and contribute to the commercial catch in the Kitoi, Izhut, and Duck Bay sections. Natural stocks of pink salmon destined for the westside of Kodiak Island and other Afognak systems may also contribute to the harvest.

A pink salmon cost recovery fishery will not be held in Kitoi Bay in 1995. Fishery openings and closures are coordinated between the hatchery manager and area salmon management biologist to assure escapement and brood fish. Brood fish are retained by a net enclosure in the estuary. Big Kitoi Creek escapement is monitored at a weir. Coordinated management of a fisheries and brood stock collection has been effective at Kitoi for the past 15 years.

The Kitoi Bay (252-32) Section will be managed under the guidelines in the East Afognak Management Plan, with an opening to harvest excess males which usually arrive in the early portion of the run. Additional openings in this area, in order to harvest pink salmon in excess of the hatchery needs, may occur. It is an annual objective that the hatchery brood fish provide at least 60% females to allow for egg take goals, and for fish to be available to spawn over a four week period, to assure the maintenance of genetic diversity.

Depending on run strength and timing, the Kitoi Bay Section may close to commercial salmon fishing between August 6 and August 10. If further closures are needed to insure adequate brood stock, the Izhut Bay and Duck Bay Sections may also close to commercial salmon fishing.

Chum Salmon

Chum salmon returns to Kitoi Bay hatchery are expected to total 150,000 adults in 1995. Approximately 30,000 adults will be needed for brood stock. The Area Management Biologist and Hatchery Manager will coordinate openings in Izhut Bay and Duck Bay, statistical areas 252-30 and 252-31 to harvest chum salmon during the June sockeye and early July pink salmon fisheries. Most of the chum salmon are expected to be in inner Kitoi Bay by late July. No additional closure time in the June sockeye fisheries in Duck Bay, statistical area 252-31, is expected this year. The incidental harvest of hatchery bound chum salmon

has been estimated to be as high as 50% of the run in some years. The major areas of interception have been Duck Bay (252-31), Izhut Bay (252-30) and Kitoi Bay (252-32). Commercial fishing in these areas, prior to July 10, is expected and will be carefully monitored to determine the run timing and strength and to insure the hatchery brood stock. A targeted fishery on early run chum salmon may occur inside Kitoi Bay this year.

Coho Salmon

Coho salmon returning to Little Kitoi Lake will be protected from the commercial fishery by a 500 yard closure seaward from the stream mouth. Some coho will be harvested incidental to the pink salmon fishery in the Kitoi area as well as in the September coho fishery. Hatchery brood stock will be collected from the returns to Kitoi Hatchery. The closure should be sufficient to meet brood stock and escapement requirements. Fishery openings or closures by emergency order can be enacted if necessary to protect the run or harvest excess fish.

Sockeye Salmon

The sockeye run to Little Kitoi Lake, from late run Upper Station donor stock, is projected to be approximately 10,000 fish. The commercial salmon fishery will be managed to allow the collection of brood stock inside Little Kitoi Bay. Adults are expected to enter the fishery in July and August peaking in early August. The brood stock will be protected by proportional bay closures in coordination with the pink salmon harvest. Fishing time will be driven by the strength and timing of the pink salmon run. Fishery openings and closures by emergency order may be enacted to protect brood stock in inner Kitoi or harvest excess fish. An escapement of 15,000 will meet the needs for both Pillar and Kitoi hatcheries.

The development of an early run sockeye fishery in the Izhut Bay area is planned using Afognak stock. The run timing would allow a fishery in early June slightly ahead of the chum salmon return with some overlap. A small run is expected in 1995; insufficient to require a directed commercial common property fishery.

F. Return Sites: Crescent Lake, Jennifer Lake, Ruth Lake, Katmai Creek, and Little Kitoi Lake.

Coho Salmon

Crescent Lake, near the city of Port Lions, has an approved management plan. Coho stocking was reduced to facilitate sockeye stocking in the lake. Katmai Creek, near the city of Ouzinkie, is being stocked with pre-smolt to facilitate a sport/subsistence fishery. This fishery will provide harvestable coho for all user groups. Stocking of Jennifer and Ruth lakes, both located in close proximity of the hatchery, will supplement the commercial fishery in the Kitoi area. Fry stocked into the Little Kitoi Lake system will supplement natural production. Smolt released from the hatchery will produce a commercial coho fishery in Kitoi Bay.

SPECIAL STUDIES/RESEARCH

Sockeye

The sockeye salmon development program will focus on rearing and release of yearling smolt and pre-smolt. The zero-age smolt program will continue, however, due to less than predicted returns to date, will have less emphasis. A portion of the sockeye salmon releases will continue to be marked by fin clipping to assist with determining the success of a given rearing strategy and to assess if zero age releases stray when returning as adults (Table 4). This will be accomplished by assessing returns for age, lengths, and marks at the Little Kitoi fish ladder and for marks at weirs at Pauls Bay and Afognak Lake. The weir/fish ladder compound will be used to pass and count sockeye into the lake from May 15 to August 25. Sockeye will be sampled for age and lengths. A total of 20% of the returning fish at Little Kitoi Lake will be inspected for marks. All brood fish spawned at Little Kitoi will be examined on the rack for marks. A total of 13,000 and 7,500 sockeye will be the target number to inspect for marks at Paul's and Afognak Lakes, respectively, each year, for four years. All marked fish will be aged and measured from mid-eye to tail fork. The fisheries in Duck Bay, Izhut Bay, and Kitoi Bay sections will also be sampled for age and length data as well as checking for marks. A total of 600 fish will be sampled. Another 240 fish will be sampled from the commercial fishery.

In addition, sockeye smolt will be sampled, at Little Kitoi outlet, weekly, and one sample will be collected at Jennifer Lakes for growth information. Hydroacoustics and an electronic counter will be used to estimate the smolt outmigration from Little Kitoi Lake.

Lake limnological surveys will be continued at Sorg, Little Kitoi, Jennifer, Pillar and Ruth Lakes as part of the Kitoi enhancement evaluation program.

Chum

A total of 600 chum salmon will be sampled for age and length in 1995 at the spawning rack at the hatchery. This data is necessary to ascertain year-class survival, as more extensive rearing appears to be increasing survival.

Coho

Coho salmon smolt will be sampled for condition and length frequency prior to release to determine survival relationship.

ADDITIONAL INFORMATION

The following information is provided in Appendix A: Description of Kitoi Bay Hatchery facilities, proposed and historical egg takes at Upper Station and Little Kitoi Lakes, Kitoi Bay Hatchery standard marine survival estimates, and Kitoi Bay Hatchery releases for 1995-1997.

Table 1. Kitoi Bay Hatchery stocking levels, locations, and projected adult returns, 1995.

Species	Stock Used	Adults	Eggs ($\times 10^6$)	Stocking ($\times 10^6$) No.	Location	Return
Pink	B.Kitoi Creek	157,000	174.0	153.0	B.Kitoi Bay	3.0
Chum	B.Kitoi Creek	14,000	14.0	10.0	B.Kitoi Bay	0.22
Coho	L.Kitoi Lake	150	0.375	0.26	B.Kitoi Bay (BR 93)	0.026
	L.Kitoi Lake	90	0.175	0.165	Crescent Lk.	0.003
	L.Kitoi Lake	15	0.025	0.015	Katmai Lk.	0.001
	L.Kitoi Lake	90	0.175	0.165	Jennifer Lk.	0.003
	L.Kitoi Lake	40	0.075	0.060	Ruth Lk.	0.001
	L.Kitoi Lake	60	0.125	0.100	L.Kitoi Lk.	0.002
	Totals	**445**	**0.950**	**0.765**		**0.036**
Sockeye	Upper Station Lake	180	0.372	0.298	L.Kitoi Lake [a]	0.003
	L.Kitoi Lake	660	1.0	0.975	L.Kitoi Bay (BR 93)	0.146
	L.Kitoi Lake	180	0.200	0.150	L.Kitoi Lake	0.015
	Totals	**1,020**	**1.572**	**1.423**		**0.164**
All Species	Totals	172,825	190.522	165.188		3.420

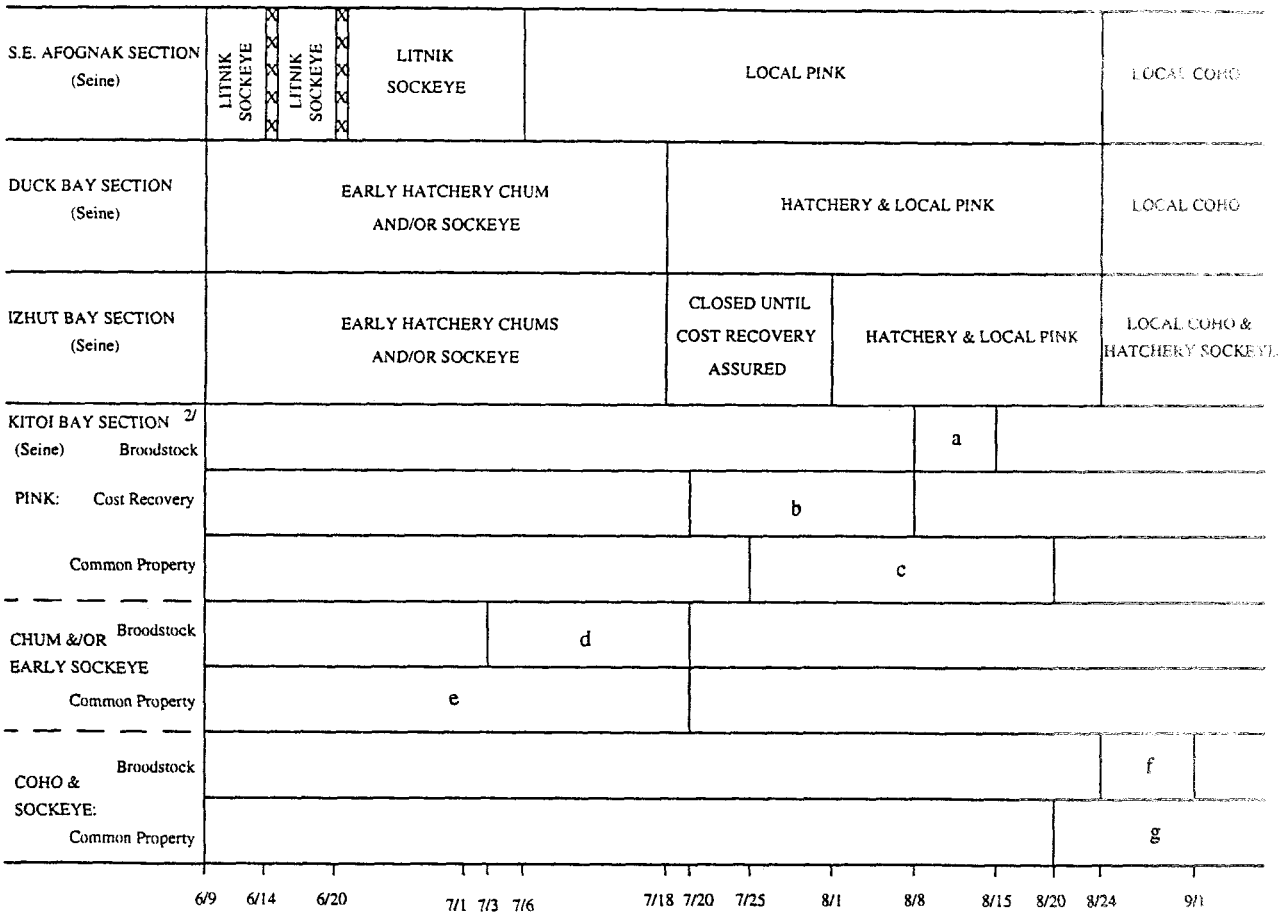
[a] Alternate stocking sites: Spiridon and Jennifer Lakes

Table 2. Planned egg takes for 1995, projected stocking numbers and locations, and adult returns.

Species	Stock Used	Adults	Eggs (x 10^6)	Stocking (x 10^6) No.	Location (1996)	Projected Return
Pink	B.Kitoi Creek	250,000	215.0	182.0	B.Kitoi Bay	2.7
Chum	B.Kitoi Creek	19,000	25.0	18.7	B.Kitoi Bay	0.375
Coho	L.Kitoi Lake	700	1.0	0.75	B.Kitoi Bay (1997)	0.075
	L.Kitoi Lake	126	0.204	0.163	Crescent Lk.	0.003
	L.Kitoi Lake	13	0.019	0.015	Katmai Lk.	0.001
	L.Kitoi Lake	126	0.204	0.163	Jennifer Lk.	0.003
	L.Kitoi Lake	50	0.075	0.035	Ruth Lk.	0.002
	L.Kitoi Lake	85	0.125	0.100	L.Kitoi Lk.	0.002
	Totals	**1,100**	**1.627**	**1.226**		**0.086**
Sockeye	Upper Station/ L.Kitio Lk	180	0.370	0.264	L.Kitoi Lake	0.0026
	Upper Station/ L.Kitio Lk	1,050	1.000	0.880	L.Kitio Bay (1997)	0.132
	Upper Station/ L.Kitoi Lk	160	0.200	0.150	L.Kitoi Lk	0.015
	Totals	**1,390**	**1.570**	**1.294**		**0.150**
All Species	Totals	271,490	243.197	203.220		3.311

Table 3. Primary management species and fishery chronology of the Eastside Afognak Management Plan for the Kodiak Management Area, 1995.

TARGETED SPECIES BY SYSTEM AND TIME FOR SPECIFIC MANAGEMENT UNITS [1/]



- fishing time dependant upon sockeye escapement into Litnik system.

1 Included in this management plan are the harvest strategies for current natural and hatchery prodution as well as future hatchery production.

2 The management plan required for the Kitoi Bay Section is rather complicated in order to achieve broodstock, cost recovery, and common harvest requirements. This is further complicated by the multispecies production currently occurring at Kitoi Bay hatchery. The diagram shown attempts to approximate dates for when specific management strategies should be implemented to insure achievement of hatchery goals and an orderly harvest of quality common property fish.

a Hatchery pink salmon broodstock captured.
b Hatchery pink salmon cost recovery fishery when necessary.
c Hatchery pink salmon common property fishery.
d Hatchery chum and/or early sockeye salmon broodstock captured.
e Hatchery chum and/or early sockeye salmon common property fishery.
f Hatchery coho and late sockeye salmon broodstock captured.
g Hatchery coho and late sockeye salmon common property fishery.

Table 4. Marking of sockeye salmon for Kitoi Bay evaluation, past, present and proposed.

	Early Run (ER)	Late Run (LR)	Comment
BR 1991			
Life Stage	**Zero-Age**	**N/A**	**Net pen reared and released in L. Kitoi Bay**
Brood stock	Afognak	N/A	
# Stocked	182,000	N/A	**ER from Pillar**
# Marked	30,000 LV	N/A	
BR 1992			
Life Stage	**Zero-Age[a]**	**Zero-Age[a]**	
Brood Stock	Afognak	Upper Station	
# Stocked	0	0	
# Marked	0 LV	0 LV	
Life Stage	**Pre-Smolt[a]**	**Pre-Smolt[a]**	**Moved to (LR) smolt program**
Brood Stock	Afognak	Upper Station	
# Stocked	0	0	
# Marked	0 RV	0 Ad RV	
Life Stage	**Age 1. Smolt**	**Age 1. Smolt**	**Increased (LR) by 150,000**
Brood Stock	Afognak	Upper Station	
# Stocked	0	326,500	
# Marked	0 Ad LV	19,968 RV	

-Continued-

Table 4. (page 2 of 3)

	Early Run (ER)	Late Run (LR)	Comment
BR 1993			
Life Stage	**Zero-Age**	**Zero-Age**	**Early run from Pillar Hatchery.**
Brood Stock	Afognak	Upper Station	
# Stocked	293,000	1,700,000	
# Marked	20,106 LV	40,950 LV	
Life Stage	**Pre-Smolt**	**Pre-Smolt**	**Early run from Pillar Hatchery**
Brood Stock	Afognak	Upper Station	
# Stocked	183,000	10,108	
# Marked	10,103 RV	10,108 Ad RV	
Life Stage	**Age 1. Smolt**	**Age 1. Smolt**	
Brood Stock	Afognak	Upper Station	
# Stocked	0	975,000	To be released in May 1995
# Marked	0 Ad LV	59,950 Ad LV	
BR 1994			
Life Stage	**Zero-Age**	**Zero-Age**	**Early run from Pillar Hatchery.**
Brood Stock	Afognak	Upper Station	
# Stocked	0	275,000	
# Marked	0 LV	TBD LV	

-Continued-

Table 4. (page 3 of 3)

	Early Run (ER)	Late Run (LR)	Comment
Life Stage	**Pre-Smolt**	**Pre-Smolt**	**Early run from Pillar Hatchery**
Brood Stock	Afognak	Upper Station	
# Stocked	150,000	150,000	
# Marked	10,000 RV	10,000 Ad RV	
Life Stage	**Age 1. Smolt**	**Age 1. Smolt**	
Brood Stock	Afognak	Upper Station	
# Stocked	0	880,000	
# Marked	0 Ad LV	40,000 Ad LV	

[a] All these fish were lost to IHNV.
N/A Not applicable
LV Left Ventral fin clip
RV Right Ventral fin clip
Ad LV Adipose and Left Ventral clip
Ad RV Adipose and Right Ventral clip
TBD To be determined

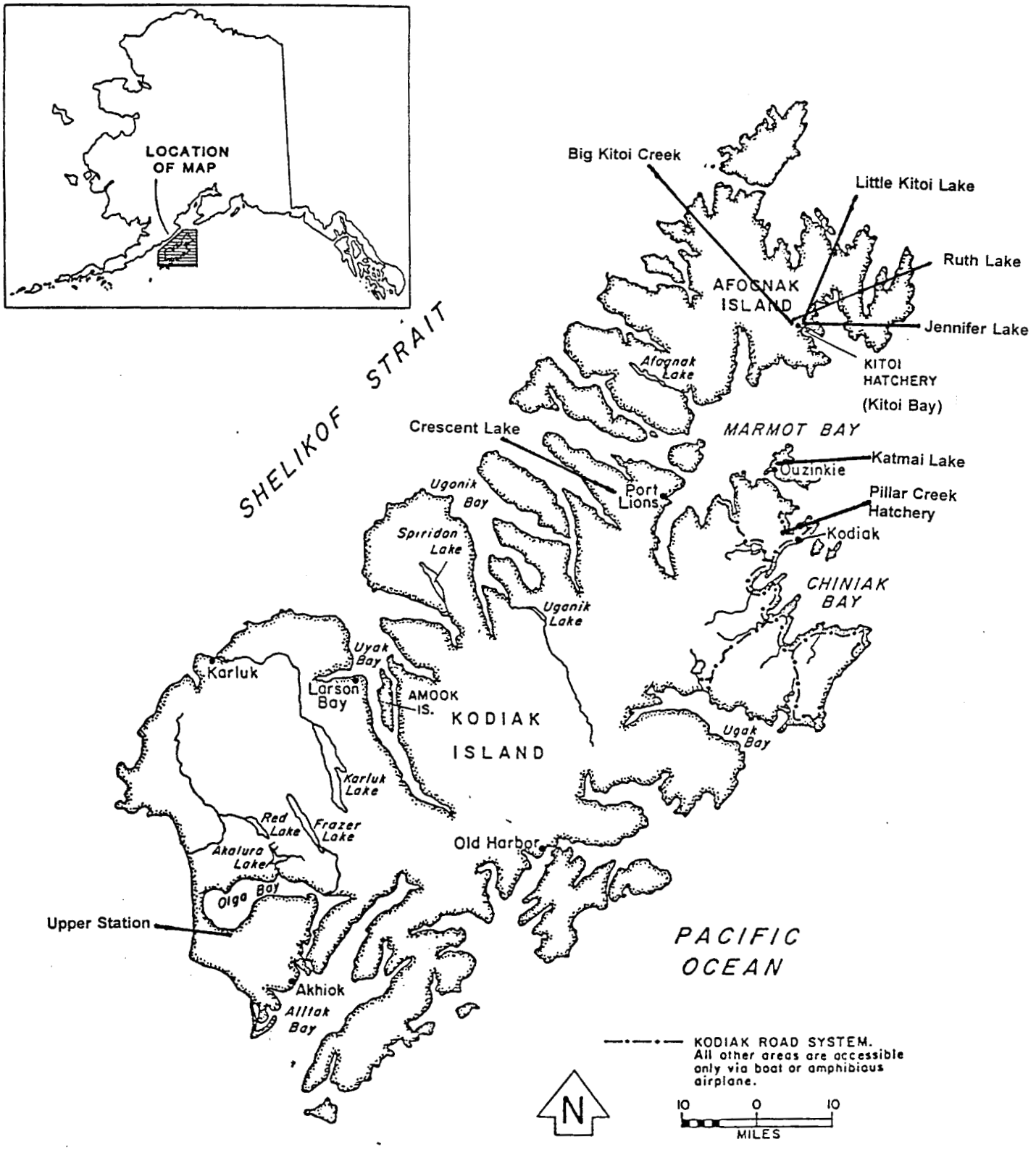


Figure 1. Map of Kodiak and Afognak Islands showing release sit Kitoi Bay, Little Kitoi, Ruth, Crescent, and Katmai and egg take sites: Big Kitoi Creek, Little Kitoi, Upper Station Lakes.

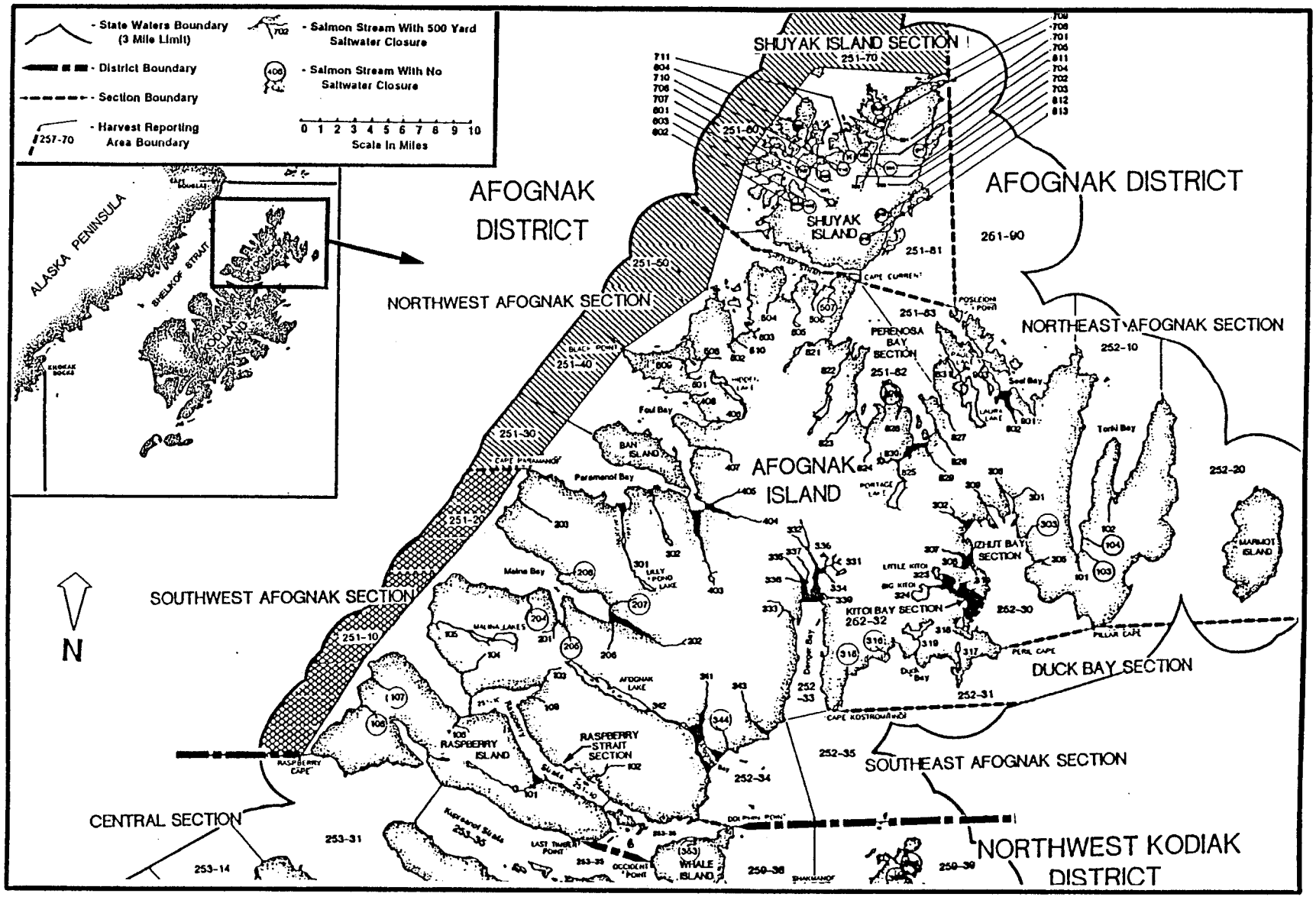


Figure 2. Afognak District of the Kodiak Management Area.

APPENDIX

Appendix A.1. Description of Kitoi Bay Hatchery facilities.

The hatchery is powered by two (2) 75 kw line generators mounted on Perkins diesel engines run on alternate weeks. A third 30 kw line generator, mounted on a Duetz diesel engine, serves as a back-up power source with automatic switch gear to prevent power failure. The bunkhouse and hatchery buildings are heated by four (4) diesel fired multi-temperature furnaces, as well as utilizing waste heat from the gensets as an auxillary source.

A metal frame and urethane insulated hatchery building, constructed in 1965 after being destroyed during the 1964 earthquake, provides for an office, shop, incubation facility and heated storage area. In 1990, the asbestos insulation in the building was removed and replaced by urethane foam with a cement fire barrier.

A wood frame bunkhouse provides for a staff apartment, and living quarters for 17 staff.
Three single family homes were constructed in 1984 to provide housing for permanent staff.

A 30 ft. by 40 ft. storage building was constructed in 1986 to safeguard the boats and other equipment used at the hatchery.

Two 70 ft. aluminum raceways were installed in 1988 along with a tailrace, transport channel and two steeppass ladders. Two more 50 foot raceways were installed in 1990. Modification of the fish pass ladder was completed in 1991 to ease the passage of pink salmon to a shore based spawning system.

A sea water pump was installed in 1989 to supply seawater to the hatchery incubation area for fungus control, replacing the necessity for chemical treatment.

A sockeye salmon incubation module was installed at the facility in 1989, providing capacity to incubate over 3.6 million sockeye salmon eggs. Also, ten aluminum raceways (20' x 3' x 3'), capable of either short-term rearing of 4.2 million fry or 2.6 million fingerlings (2.5 g) or 880,000 (8 gram) smolt and 150,000 pre-smolt (6 gram) were installed in 1994.

The hatchery utilizes 17 - 40' x 40' x 12' and 15 - 20' x 20' x 12' net pens for saltwater rearing of pinks, chum, coho and sockeye salmon.

An additional incubation building completed in 1989 increased the pink salmon incubation capacity by 80 million eyed eggs.

A carcass disposal/fry release line was installed in 1991 which provides for the transport of carcasses to the main dock for disposal. A fish lift was purchased and installed in 1992 to remove carcasses from the spawning operation in the creek.

-Continued-

Since 1992, a 30 ft. x 16 ft. aluminum barge has been used for salmon carcass removal. The barge eliminated the cost of a carcass removal contract and allowed disposal during normal working hours.

Water for the hatchery and domestic use is supplied from Big Kitoi Lake by two 14 inch pipelines 1,600 feet in length, with approximately 100 feet of head between the facility and the lake. All water received is screened through 1/8 inch Johnson wire at the intake structure. Process water in the hatchery is again filtered through double canister filters utilizing 0.01 inch mesh commercial stainless steel screen inserts. Cold water used to incubate chum salmon eggs and the early stages of pink salmon egg incubation is supplied by a second 14 inch pipeline installed in 1986, which draws water from 55 foot depth in the lake. In 1992, an additional cold water delivery plastic pipe 20" in diameter was installed in Big Kitoi Lake providing for the capability of supplying cold water to the entire hatchery. An ultra-violet (UV) light disinfection system was installed in 1991 to treat chum and sockeye salmon incubation water. Domestic water is also filtered through a canister filter and is treated by UV light prior to use. With the complete installation of the 20 inch deep water intake, approximately 25 CFS of water is available for use at the hatchery.

Appendix A.2. Upper Station sockeye salmon egg takes, past, present, and proposed.

Brood Year	Adults	Eggs (millions)	Facility	No. Stocked and Year (millions)	Stocking Location
1988	120	0.2	KBH	0.15 - 1989	Kitoi Bay
1989	3,000	5.0	PCH/KBH	0.26 - 1990	Spiridon Lake
				0.8 - 1990	L. Kitoi Bay
				0.3 - 1990	L. Kitoi Lake
1990	3,700	4.5	PCH	3.5 - 1991	Spiridon Lake
		1.5	KBH	1.25 - 1991	L. Kitoi Bay
1991	3,800	4.0	PCH	2.2 - 1992	Spiridon Lake
		2.3	KBH	1.8 - 1992	L. Kitoi Bay
1992	6,816	9.8	PCH	4.2 - 1993	Spiridon Lake
		1.9	KBH	0.05 - 1993	L. Kitoi Lake
				0.3 - 1994	L. Kitoi Bay
1993	5,551	7.8	PCH	5.0 - 1994	Spiridon Lake
				0.3 - 1994	Jennifer Lake
		2.0	KBH	1.6 - 1994	L. Kitoi Bay
1994	120	0.3	PCH	0.0 - 1995	Spiridon Lake
				0.2 - 1995	Jennifer Lake
	120	0.3	KBH	0.0 - 1995	L. Kitoi Bay
				0.3 - 1995	Jennifer Lake[a]
				0.3 - 1995	L. Kitoi Bay[a]
1995	5,671	10.3	PCH	8.0a - 1996	Spiridon Lake
				0.2 - 1996	Jennifer Lake
	120	0.3	KBH	0.0 - 1995	L. Kitoi Bay
				0.2 - 1996	Jennifer Lake[a]
				0.2 - 1996	L. Kitoi Lake[a]

[a] Stocking level will be finalized in season after review of 1995 limnological data from Spiridon Lake
[b] Will be stocked at either Jennifer Lake or Little Kitoi Lake; determined in season based on l· evaluation at Jennifer Lake.

Appendix A.3. Little Kitoi Lake sockeye salmon egg takes, past, present, and proposed.

Brood Year	Adults	Eggs (millions)	Facility	No. Stocked and Year (millions)	Stocking Location
1992	1,011	0.59	KBH	0.0 - 1993	L. Kitoi Bay
1993	1,050	1.1	KBH	0.88 - 1995	L. Kitoi Bay
1994	600	1.5	KBH	0.0 - 1995	L. Kitoi Bay
				0.15 - 1995	L. Kitoi Lake
				0.88 - 1996	L. Kitoi Bay
				0.3 - 1995	Jennifer Lake
1995	600	1.5	KBH	0.0 - 1996	L. Kitoi Bay
				0.15 - 1996	L. Kitoi Lake
				0.88 - 1997	L. Kitoi Bay
	9,623[a]	10.4	PCH	8.0 - 1996	Spiridon Lake
				0.3 - 1996	Jennifer Lake

[a] The run size to Little Kitoi Lake is not expected to provide for egg take goal, however, collection of eggs is preferred at this site (U.Station will provide for remainder of eggs). In season limnology data will be used to finalize the eggtake and fry stocking goals.

Appendix A.4. Kitoi Bay Hatchery standard marine survival estimate.

Species	Life Stage	Survival Estimate (%) Freshwater Release [a]	Freshwater Release [b]	Marine Release
Pink	Fry (0.5g)			1.5
Coho	Fingerling (1.5g)		6.0	2.0
Coho	Pre-Smolt (5.0g)	7.0		5.0
Coho	Smolt (20g)	10.0	10.0	10.0
Chum	Fingerling (2g)			2.0
Sockeye	Fingerling (1.5g)	5.5	3.0	
Sockeye	Pre-smolt (5.0g)	12.5	10.0	
Sockeye	Smolt age 0. (3.0g)	5.0	1.5	1.0
Sockeye	Smolt age 1. (8g)	15.0	15.0	15.0

[a] Non-competitive systems: Ruth Lake and Katmai Creek.

[b] Competitive systems: Jennifer, Crescent and Little Kitoi.

Appendix A.5. Kitoi Bay Hatchery brood source and stocking flow chart for 1995 release from 1993 egg take.

Little Kitoi
Sockeye Salmon

1,100,000 eggs

975,000 10.0 gram age 1. smolt

1995 release in Little Kitoi Bay. FTP # 93A-0117.

Appendix A.6. Kitoi Bay Hatchery brood source and stocking flow chart for 1995 release from 1993 and 1994 egg takes.

Big Kitoi Creek
Pink Salmon

174.0×10^6 eggs	FTP #81A-0241
7×10^6 fry Big Kitoi Bay volitional release	
146×10^6 fed fry Big Kitoi Bay pen reared release	

Big Kitoi Creek
Chum Salmon

14.4×10^6 eggs	FTP #81-156
10.5×10^6 2.0 gram Big Kitoi Bay pen reared release	

Little Kitoi Creek
Coho Salmon

1.5×10^6 eggs (BR 93)		FTP #88A-1056 FTP #83A-1011
260,000 20.0 gram age 1. smolt - Big Kitoi Bay		FTP #88A-1059
Crescent Lake	165,000 fingerlings	FTP #92A-0079
Katmai Creek	15,000 pre-smolt	FTP #92A-0081
Little Kitoi	100,000 fry	FTP #92A-0089
Ruth Lake	60,000 fingerlings	FTP #92A-0083
Jennifer Lake	165,000 fingerlings	FTP# 92A-0080?

Little Kitoi
Sockeye Salmon

1.0×10^6 eggs (BR 93)	FTP #92A-0087
975,000 8.0 gram age 1. smolt - Little Kitoi Bay	FTP #93A-0017

Upper Station
Sockeye Salmon

0.370×10^6 eggs	
0.298×10^6 zero-age 3 gram smolt at Little Kitoi Lake	FTP # 88A-1047
or Jennifer Lake	FTP # 94A-0040

Appendix A.7. Kitoi Bay Hatchery brood source and stocking flow chart for 1996 and 1997 release from 1995 egg take.

Big Kitoi Creek
Pink Salmon

215×10^6 eggs — FTP #81-241

42×10^6 volitional release in Kitoi Bay (1996)
140×10^6 fed fry release in Kitoi Bay (1996)

Big Kitoi Creek
Chum Salmon

25×10^6 eggs — FTP #81-156

18.7×10^6 2.0 gram fingerlings release in Kitoi Bay (1996)

Big Kitoi Creek
Coho Salmon

1.7×10^6 eggs

750,000	20.0 gram smolt for release in Kitoi Bay (1997)	FTP #88A-1059
Crescent Lake	165,000 fingerlings	FTP #92A-0079
Katmai Creek	15,000 pre-smolt	FTP #92A-0081
Jennifer Lake	163,000 pre-smolt	FTP #92A-0080
Ruth Lake	35,000 fingerlings	FTP #92A-0083
Little Kitoi	100,000 fingerlings	FTP #92A-0089

Little Kitoi Lake/Upper Station
Sockeye Salmon

1.5×10^6 eggs — FTP #92A-0087

0.3×10^6 zero-age 3.0 gram smolt - Little Kitoi Lake or Jennifer Lake (1996) — FTP #92A-0087, FTP #94A-0040

880,000 age 1. 8.0 gram smolt held for release in Little Kitoi Bay (1997) — FTP # 93A-0117

150,000 6.0 gram pre-smolt release in Little Kitoi Lake (1996) — FTP # 93A-0116

SIGN-OFF

Tim Joyce
Hatchery Manager, Kitoi Bay — Date 5/26/95

Steve Honnold
Area Development Biologist, CFM&D — Date 5/26/95

Dave Prokopowich
Area Management Biologist, CFM&D — Date 5/26/95

Wayne Donaldson
Regional Management Biologist, CFM&D — Date 5/26/95

Pete Probasco
Regional Supervisor, CFM&D — Date 5/26/95

Len Schwarz
Area Biologist, ~~Sport~~ Fish — Date 5/26/95

Kevin Delaney
Sport Fish Regional Supervisor — Date

Larry Malloy
Executive Director, KRAA — Date 6/5/95

The 1995 Annual Management Plan for Kitoi Bay Hatchery is hereby approved:

Deputy Commissioner — Date